

Date: Thursday, 3/8/2007 1:15:34 PM
 User: Kim Johnston

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: BRACKET
Job Number	: 31120		
Estimate Number	: 10809		
P.O. Number	:	Part Number	: D3177043
This Issue	: 3/8/2007 S.O. No. :	Drawing Number	: D3177 REV B2
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: / / Type : MACHINED PARTS	Drawing Revision	: B2
Previous Run	: 24883	Material	:
Written By	:	Due Date	: 4/1/2007 Qty: 2 Um: Each
Checked & Approved By	: <u>KJ 07.03.08</u>		
Comment	: Est Rev. B 03.01.27 Added Step 12 KJ/RF		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	M6061T6B1000X12000	6061-T6 Bar 1.0" x 12.0"
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Comment: Qty.: 4.1562 f(s)/Unit Total : 8.3124 f(s)
 6061-T6 Bar 1.0" x 12.0"
 Material: 6061-T6 (QQ-A-200/8) or (QQ-A-250/11) 1.00" thick
 (M6061T6B1.000x12.000 or M6061T6S1.000)
 Batch ~~M9601~~ M9601

CRP

07/03/09

3

2.0	BAND SAW	BAND SAW
-----	----------	----------



Comment: BAND SAW
 Cut blank: 47.40" x (12.000" +0.100/-0.000)

07/03/09

3

3.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
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Comment: HAAS CNC VERTICAL MACHINING #1
 Machine part as per Folio FA291 and Dwg D3177.
 Deburr

SA 07.03.12

4.0	QC2	INSPECT PARTS AS THEY COME OFF MACHINE
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Comment: INSPECT PARTS AS THEY COME OFF MACHINE

SA 07.03.12

5.0	QC8	SECOND CHECK
-----	-----	--------------








Comment: SECOND CHECK

070

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
07-03-22	3.0	Parts are undersize i, under tolerance.	 07/03/22	Scrap & destroy, no replace. See Attached e-mail.	 07/03/22	 07-03-22		 07-03-22

NOTE: Date & initial all entries

Process Sheet

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Drawing Name: BRACKET

Job Number: 31120

Part Number: D3177043

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

7.0

D31775

Spacer



Comment: Qty.: 4.0000 Each(s)/Unit Total : 8.0000 Each(s)

Spacer

Pick:

Qty Part Number Description Batch

4 D3177-5 Spacer

8.0

SMALL FAB 1

SMALL & MEDIUM FAB RESOURCE 1



Comment: SMALL & MEDIUM FAB RESOURCE 1

Press D3177-5 Spacers as shown on Dwg D3177

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

11.0

D26906

Lanyard



Comment: Qty.: 1.0000 Each(s)/Unit Total : 2.0000 Each(s)

Lanyard

Pick:

Qty Part Number Description Batch

1 D2690-6 Lanyard

12.0

AN960JD10

Washer



Comment: Qty.: 3.0000 Each(s)/Unit Total : 6.0000 Each(s)

Washer

Pick:

Qty Part Number Description Batch

3 AN960JD10 Washer

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Job Number:



Seq. #:

Machine Or Operation:

Description :

13.0

BLRS010

Pip Pin



Comment: Qty.: 1.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pip Pin

Pick:

Qty	Part Number	Description	Batch
1	BLRS-010	Pip Pin	

14.0

MS21042L3

Nut



Comment: Qty.: 1.0000 Each(s)/Unit Total : 2.0000 Each(s)

Nut

Pick:

Qty	Part Number	Description	Batch
1	MS21042L3	Nut (or -3)	

15.0

MS27039111

Screw



Comment: Qty.: 1.0000 Each(s)/Unit Total : 2.0000 Each(s)

Screw

Pick:

Qty	Part Number	Description	Batch
1	MS27039-1-11	Screw	

16.0

SMALL FAB 1

SMALL & MEDIUM FAB RESOURCE 1



Comment: SMALL & MEDIUM FAB RESOURCE 1

Assemble as per Dwg D3177

17.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

18.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Job Number:



Seq. #:

Machine Or Operation:

Description :

19.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



22 OF 25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

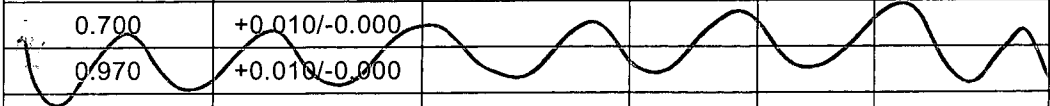
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

D3065-5DART AEROSPACE LTD		Work Order:	31120
Description: Bracket		Part Number:	D3177-3
Inspection Dwg: D3177 Rev: B2		Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
0.970	+0.010/-0.000					
R0.125	+/-0.010	R.125	/			
0.700	+0.010/-0.000	.708	/			
0.188	+0.010/-0.000	.192	/			
10.776	+/-0.005	10.777	/			
R0.625	+/-0.010	R.625	/			
Ø0.261	+0.005/-0.000	Ø.261	/			
0.200	+/-0.010	.198	/			
Ø0.203	+0.005/-0.000	Ø.203	/			
Ø0.625	+0.001/-0.000	Ø.625	/			
3.733	+0.000/-0.005	3.732	/			
0.575	+/-0.010	.569	/			
0.700	+0.010/-0.000					Same as above
0.970	+0.010/-0.000					

Measured by:	SD	Audited by:		Prototype Approval:	N/A
Date:	07.03.11	Date:		Date:	N/A

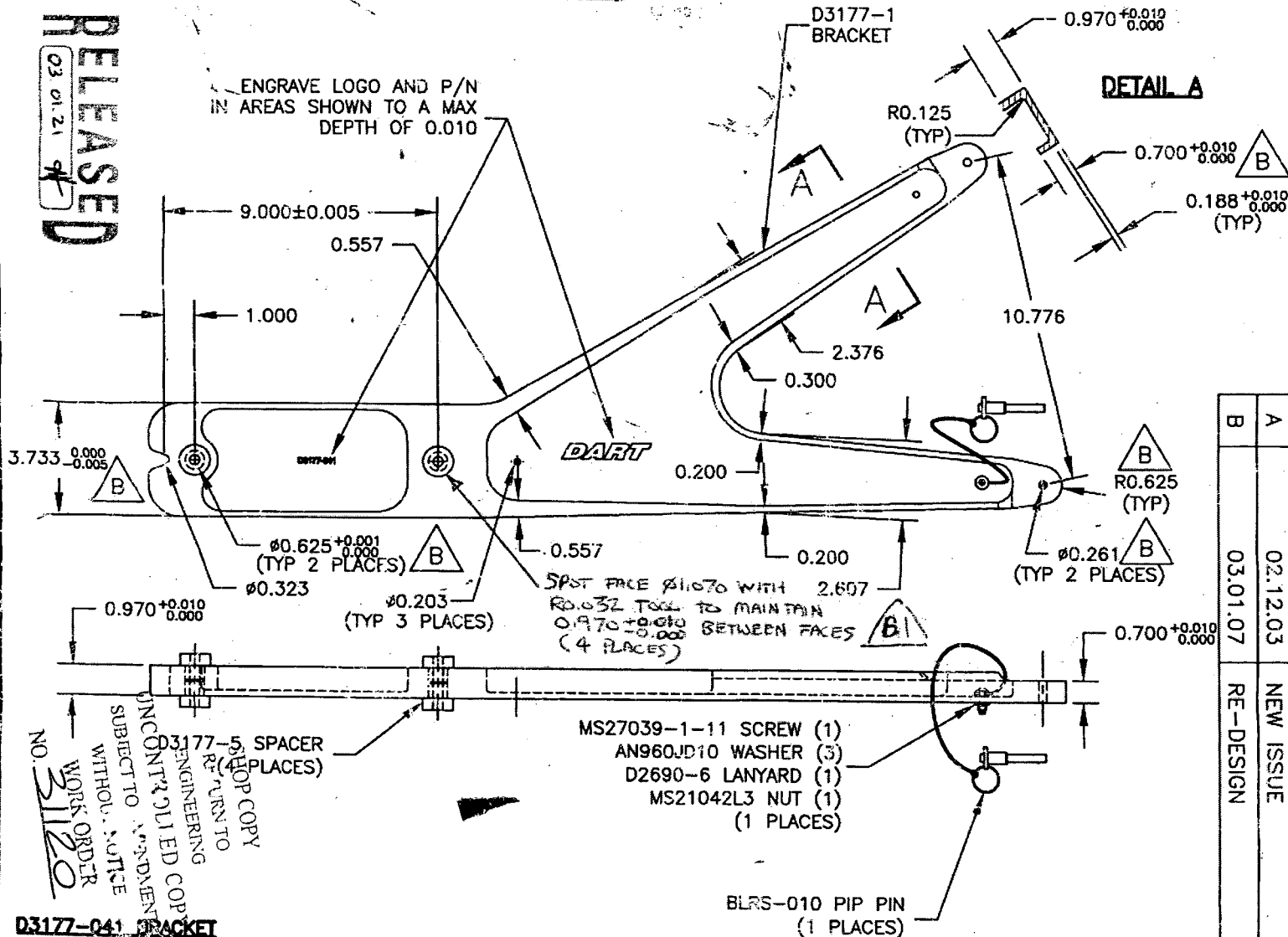
Rev	Date	Change	Revised by	Approved
A	04.02.25	New Issue P/O D3177-041/-043	KJ/RF	JH

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100

B1	03.02.25	CP #	ADD SPOT FARE
B2	03.11.24	CP #	ADD D3177-7

03.01.21



D3177-041 BRACKET

- 1) MACHINE D3177-1 PER DART DWG "D3177-1.SLDPR1"
MATERIAL: 6061-T6 ALUMINUM BAR (QQ-A-250/11 OR QQ-A-200/8)
(REF DART SPEC. M6061T6S OR M6061T6B)
- 2) BREAK ALL SHARP EDGES 0.005 TO 0.015
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1, (PRIOR TO ASSEMBLY)
POWDER COAT WHITE (4.3.5.1) PER DART QSI 005 4.3 (AFTER ASSEMBLY)
- 4) TOLERANCES ARE PER QSI 018 UNLESS OTHERWISE NOTED
- 5) ALL DIMENSIONS ARE IN INCHES

DESIGN		UNIFORM		DART AEROSPACE LTD HAMKESBURY, ONTARIO, CANADA	
CHECKED	APPROVED	DRAWING NO.		REV. B	
<i>[Signature]</i>	<i>[Signature]</i>	D3177		SHEET 1 OF 3	
DATE		TITLE		SCALE	
03.01.07		BRACKET		1:5	
A	02.12.03	NEW ISSUE			
B	03.01.07	RE-DESIGN			

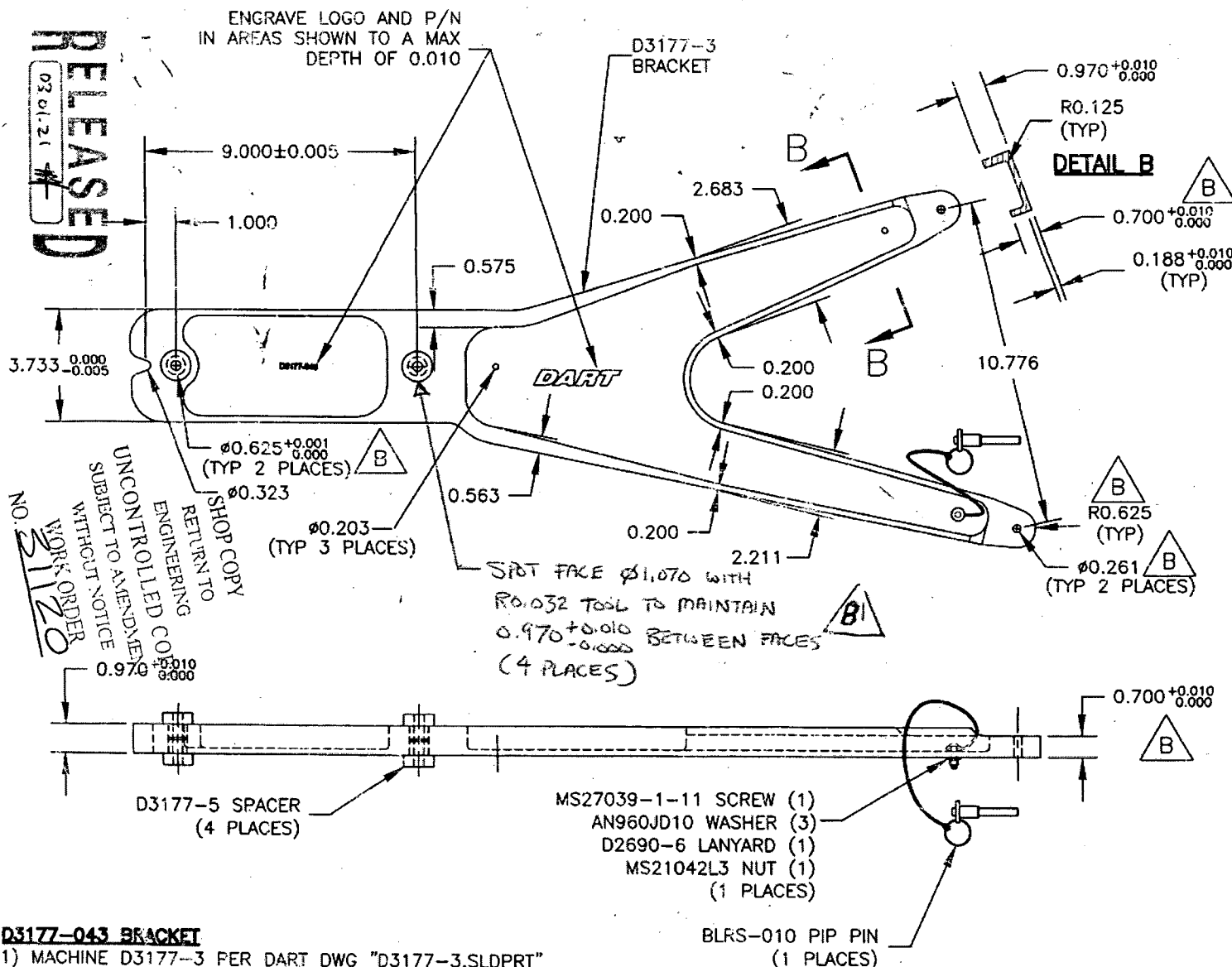
DART



DART



DESIGN	CH	DRAWN BY	CH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED	CH	APPROVED	CH	DRAWING NO.	REV. B
DATE	03.01.07			D3177	SHEET 2 OF 3
				TITLE	SCALE
				BRACKET	1:5



D3177-043 BRACKET

- 1) MACHINE D3177-3 PER DART DWG "D3177-3.SLDPR" MATERIAL: 6061-T6 ALUMINUM BAR (QQ-A-250/11 OR QQ-A-200/8) (REF DART SPEC. M6061T6S OR M6061T6B)
- 2) BREAK ALL SHARP EDGES 0.005 TO 0.015
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 (PRIOR TO ASSEMBLY) POWDER COAT WHITE (4.3.5.1) PER DART QSI 005 4.3 (AFTER ASSEMBLY)
- 4) TOLERANCES ARE PER QSI 018 UNLESS OTHERWISE NOTED
- 5) ALL DIMENSIONS ARE IN INCHES

RELEASED
03.01.21

NO. 2120
WORK ORDER
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WITHOUT NOTICE



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Jason Murdoch

From: S Shahbazian [sshahbazian@dartaero.com]
Sent: Thursday, March 22, 2007 9:46 AM
To: 'Jason Murdoch'
Cc: 'L Lacelle'; 'C Bell'
Subject: RE: D3177 Parts not made to drawing

Jason,
Please scrap all D3177 parts.
Thanks
Serge

From: David Shepherd [mailto:dshepherd@dartaero.com]
Sent: March 22, 2007 9:42 AM
To: 'C Bell'
Cc: 'S Shahbazian'; 'L Lacelle'; 'Jason Murdoch'; 'S Shahbazian'
Subject: RE: D3177 Parts not made to drawing

Chris,

I'm not sure I agree with your assessment. Besides, I don't have the authority to change the analysis. Therefore, the D3177-041/-043 parts that were cut to 0.945" should be scrapped.

David

From: C Bell [mailto:cbell@dartaero.com]
Sent: Monday, March 19, 2007 12:25 PM
To: davids@dartaero.com
Cc: S Shahbazian
Subject: D3177 Parts not made to drawing

Hello,

Apparently, production has made a couple D3177-041 and D3177-043 Brackets with incorrect dimensions. The 0.970" thickness dimension was cut too short, to approximately 0.945". I've been punching the new number into the SR-D130-701-1 stress report to see if the brackets can still support the loaded basket.

Section C-C is the critical section for both parts. Using 0.945", and the method shown in SR-D130-701-1, the parts will yield (see Stress Analysis.pdf), so it looks like they are unacceptable, but I think the analysis is a little too conservative.

If you look at the calculations in Section 6.0 of the stress report you can see that 30" was used as the moment arm for Section C-C (distance from the section to the centroid of the bracket plus basket area), while Section A-A and Section B-B both used different (smaller) moment arms (from the section to the mounting hole). If you calculate the stress at Section C-C using a similar moment arm as A-A and B-B (from the section to the mounting hole, see Stress Analysis.pdf) the margin of safety is positive and acceptable. I don't see why a moment arm of 30" was used for Section C-C (except for being extra conservative) since the basket is not bending and the load on the part is actually applied to the mounting holes.

Do you think this deviation is acceptable or should the parts be scrapped?

Thanks,

Christopher Bell

3/22/2007